

## CLAIMS

- 1 1. A maskless lithography system comprising an array of blazed diffractive zone plates,  
2 each of which focuses an energy beam into an array of images in order to create a permanent  
3 pattern on an adjacent substrate.
- 1 2. The maskless lithography system as claimed in claim 1, wherein said blazed diffractive  
2 zone plates are blazed Fresnel zone plates.
- 1 3. An maskless lithography system comprising an array of apodized diffractive elements,  
2 each of which focuses an energy beam into an array of images in order to create a permanent  
3 pattern on an adjacent substrate at a focal area and is apodized to reduce at least one of the main  
4 or side lobes in an intensity distribution at a focal area.
- 1 4. The maskless lithography system as claimed in claim 3, wherein apodized diffractive  
2 elements are Fresnel zone plates.
- 1 5. The maskless lithography system as claimed in claim 3, wherein apodized diffractive  
2 elements are Fresnel phase plates.
- 1 6. The maskless lithography system as claimed in claim 3, wherein apodized diffractive  
2 elements are blazed Fresnel zone plates.
- 1 7. The maskless lithography system as claimed in claim 3, wherein said apodized diffractive  
2 elements are formed of photon sieves.
- 1 8. The maskless lithography system as claimed in claim 7, wherein said photon sieves are

2 amplitude photon sieves.

1 9. The maskless lithography system as claimed in claim 7, wherein said photon sieves are  
2 phase photon sieves.

1 10. The maskless lithography system as claimed in claim 7, wherein said photonic sieves are  
2 alternating phase photonic sieves.

1 11. A maskless lithography system comprising an array of diffractive elements, each of  
2 which focuses an energy beam into an array of images in order to create a permanent pattern on  
3 an adjacent substrate and has a focusing efficiency of at least 50%.

1 12. The maskless lithography system as claimed in claim 11, wherein said diffractive  
2 elements are 100% transmissive.

1 13. The maskless lithography system as claimed in claim 12, wherein said diffractive  
2 elements are alternating phase photon sieves.

1 14. A maskless lithography system comprising an array of Besel zone plates, each of which  
2 focuses an energy beam into an array of images in order to create a permanent pattern on an  
3 adjacent substrate